

THE ONLINE WORDSWORTH LITERACY PROGRAMME ©

KSP STATISTICAL ANALYSIS PROJECT 2011-12

FOREWORD

It is widely recognised today that a high percentage of students in primary, secondary and tertiary main stream schools and colleges are not reaching acceptable literacy levels. This continues into adulthood and has a devastating affect both at the individual and societal levels.

The WordsWorth Literacy Programme © (WordsWorth) is an interactive web Application for improving reading and spelling skills for people from 6 years old to adult. It replicates a “literacy intervention” used in a Private Speech & Language Therapy (SLT) Service that has been producing positive results in Ireland for nearly 20 years. No training is required to use the Application as it is a simple step-by step process that consists of 104 video tutorials with 330 interactive exercises.

The original version of the WordsWorth Literacy Programme © was delivered as a 1:1 Client Consultant Literacy Remediation Service. An earlier professional statistical analysis (2007) for this service, supported by numerous client testimonials, indicated that it delivered significant results for those with specific learning difficulties. The interactive web version of WordsWorth has now been beta-tested by teachers, students and parents at a mainstream primary school and the statistical data has been analysed by Dr David Millar (B.Sc., D. Phil.) who is a Research Associate at the Educational Research Centre (ERC), Drumcondra, Dublin.

PROJECT HYPOTHESIS

“The online “WordsWorth Literacy Programme” © when used as a “collaborative” teaching tool, by a teacher in the classroom and also at home by a parent facilitating homework tasks - will significantly increase literacy skill attainments of the students involved”.

KILKENNY SCHOOL PROJECT (KSP) - METHODOLOGY

The project involved a mainstream primary school 5th class, with 30 students. Written consent was obtained from the school principal, schoolteacher and parents to work with the students and to capture the classroom sessions on video. An introductory meeting was held where the available parents of the students involved and the teacher/resource teachers were introduced to the project.

To enable “collaboration” between all parties concerned, free access to the web version of the WordsWorth Literacy Programme © was provided for the class teacher and each of the 30 participating parents/students for follow up homework.

All children were given the standard Attainment Assessments both pre and post Project by the Class teacher involved.

The Attainment Assessment used for reading was:

The ***Drumcondra Primary Reading Test (DPRT)*** which is the standard 5th Class tests for reading vocabulary and reading comprehension:

- *Pre Project (autumn 2011) – DPRT Level 4*
- *Post Project (spring 2012) – DPRT Level 5*

The Attainment Assessment used for spelling was:

The ***Aston Index*** single word spelling test was used to assess the spelling age of each child.

- *Pre Project (autumn 2011) – Aston Index*
- *Post Project (spring 2012) – Aston Index*

From the initial assessment results from the tests in autumn 2011, the students were arranged into three groups:

- I. Weak (The red group). *
- II. Average (The blue group).
- III. Advanced (The green group).

* Note: Three of the children in the class had previously been assessed as having a Specific Learning Difficulty (SLD) and were already receiving “resource hours” in school.

It should also be noted that, as there was only one 5th class in the school, there was no option to introduce a “control group”. The results from the study are simply an analyses of the difference between the scores for the before and after “attainment assessment” tests for reading and spelling. However the statistics show that results from students who did the programme at home versus those who did not engage at home were substantively different. This evolved randomly across the three sub groups.

INTERVENTION PROCESS

There were 14 (Friday) intervention sessions of 75 minute duration arranged during school terms. Taking account of school holidays (e.g. Christmas, mid-term) the elapsed time for the project sessions ran from October 2011 to February 2012.

Each week the teacher and each of the parents were given a schedule of work to follow through in class and at home. The teacher accessed the web programme on an interactive whiteboard for the recommended 15 to 20 minutes per day. On completion of the project it was estimated by the schoolteacher that 95% of the programme had been covered in class.

Parental involvement for homework, or practise was mixed e.g. most parents of the students in the weaker group either didn't open the programme at all or began and abandoned it at an early level.

The students in the average group were more consistent with access at home and increased use as the programme became more complex.

Students in the advanced group tended either not to use the programme at home or only for the more complex sections, which the students found challenging and more interesting.

Unfortunately "resource" intervention was interrupted by maternity leave, resulting in 4 different resource teachers working with the previously identified students, with a Specific Learning Difficulty, over the 14 weeks. The WordsWorth Literacy Programme was not used with the students during school resource hours.

STATISTICAL ANALYSIS REPORT

This statistical analysis was undertaken by Dr. David Millar, B.Sc., D. Phil. (Research Associate) from the Educational Research Centre (ERC) in Drumcondra, Dublin, Ireland.

This report is based on the findings of a small scale study of one mixed Primary 5th class looking at attainment scores in English reading and spelling before and after the implementation of The Wordsworth Literacy Programme ©.

Prior to the intervention, in the autumn of 2011, pupils were assessed by the class teacher using two tests; one for reading and the second a spelling test:

1. The Drumcondra Primary Reading Test (DPRT) level 4
2. The Aston Index Spelling Test.

After the intervention, in the spring of 2012, the same pupils were tested again by the class teacher using level 5 of the DPRT and the same Aston Index Spelling Test.

The DPRT provides scale scores (with a mean of 100 and a standard deviation of 15) based on representative samples of 5th class Irish primary school pupils, at the beginning and end of the school year. The Aston Index Spelling Test provides a reading age in years and months.

Table 1 shows the mean scale scores on the DPRT before and after intervention.

Table 1: Mean Scale Scores (and Standard Deviations) on the DPRT

	Autumn 2011	Spring 2012
Vocabulary	108.0 (12.8)	112.3 (16.1)
Comprehension	106.4 (12.5)	108.1 (18.5)
Total	107.9 (12.6)	110.2 (16.4)

Note: Due to absence on days of assessment, only 29 of the 30 pupils' scores could be evaluated.

Three things are apparent from pupils' score as shown in Table 1:

1. The group of pupils were above average, in national terms, prior to the introduction of the programme – their scores were about half a standard deviation above the nation mean of 100.
2. Their scores had improved when tested again after the intervention.
3. The range of scores increased after the intervention e.g.
Autumn 2011; 11 of the 29 students (38%) had a STen score of 8 or more.
Spring 2012; 13 of the 29 students (44%) had a STen score of 8 or more (on a test that takes account of chronological age increase).

Table 2 shows the mean chronological and spelling ages before and after.

Table 2: Mean Chronological Age (in months) and Spelling Age (and Standard Deviations) on the Aston Index

Chronological Age Autumn 2011	Spelling Age Autumn 2011	Chronological Age Spring 2012	Spelling Age Spring 2012
129.0 (4.0)	132.1 (14.0)	134.8 (4.2)	141.1 (15.1)

Note: Due to absence on days of assessment, only 27 Of the 30 pupils' scores could be evaluated.

Table 2 shows that:

1. The spelling age of pupils (as measured by the Aston Index) was, on average, ahead of their chronological age by three months in autumn 2011.

- By spring 2012 this gap had increased to just over six months (mean), in fact 87.5 % of the students achieved a score of more than six months, with the maximum score improvement being 21 months.

Do these scores represent a “real” improvement?

To test whether or not the improvements in the scores on the vocabulary and comprehension subtests of the DPRT were statistically significant the mean ‘before’ and ‘after’ scale scores were analysed using a paired-samples t-test. Test data were available for 29 pupils. There was a statistically significant improvement on the vocabulary subtest ($t(28)=2.39$, $p < .05$) but no statistically significant improvement on the comprehension subtest from a group (mean) perspective. However 14 of the students (48%) made substantive improvements of between 5 to 45 percentile ranking scores between the two tests for comprehension.

For spelling, the gap between chronological age and spelling age was calculated for the autumn and spring. Aston Index data was available for 27 pupils. As with the DPRT data, this ‘before’ and ‘after’ gap was analysed using a paired-samples t-test. There was a statistically significant increase in the gap between chronological age and spelling age before and after, $t(26)=3.65$, $p < .005$.

Analysis by subgroups

The class were flagged as being in one of three groups (weaker ($n=9$), average ($n=9$) or advanced ($n=12$)) on the basis of their scores on the vocabulary subtest of the DPRT level 4 prior to the WordsWorth intervention.

Note: The DPRT tests 5th class attainment level for each child at two points in their academic year. The first test is the autumn level (4) test. The second test is the spring level (5) which takes account of the elapsed chronological age.

Tables 3-5 show the before and after scores for the three groups.

Table 3: DPRT Vocabulary Scale Score by Group (Autumn 2011 and Spring 2012)

Group	Test date	n	Minimum	Maximum	Mean	SD
Weaker	Autumn 2011	9	80	102	92.9	8.6
	Spring 2012	9	74	111	94.7	13.3
Average	Autumn 2011	9	104	111	107.2	2.9
	Spring 2012	9	101	133	117.6	10.6
Advanced	Autumn 2011	12	113	130	120.0	5.3
	Spring 2012	11	110	137	122.5	8.7

Table 4: DPRT Comprehension Scale Score by Group (Autumn 2011 and Spring 2012)

Group	Test date	n	Minimum	Maximum	Mean	SD
Weaker	Autumn 2011	9	72	111	95.4	12.9
	Spring 2012	9	62	111	89.8	16.2
Average	Autumn 2011	9	90	120	109.8	10.2
	Spring 2012	9	99	136	120.8	10.9
Advanced	Autumn 2011	12	95	127	112.1	8.6
	Spring 2012	11	99	136	112.7	13.6

Table 5: Aston Index – Gap between Chronological Age and Spelling Age (in months) by Group (Autumn 2011 and Spring 2012)

Group	Test date	n	Minimum	Maximum	Mean	SD
Weak	Autumn 2011	8	-20	19	-8.8	14.7
	Spring 2012	9	-25	20	-7.7	16.0
Average	Autumn 2011	9	-13	36	12.9	15.5
	Spring 2012	9	-12	27	17.4	12.6
Strong	Autumn 2011	11	-8	15	4.3	8.0
	Spring 2012	11	-6	22	8.5	9.6

It appears that for all three outcomes that the improvements appear strongest in the “average” group. Performance for the “weak” and “strong” groups changes much less so.

Figures 1-3 below show the same data as above in terms of “box plots”.

Box plots give a vertical view of the data where the boundaries of the box indicate the 25th percentile and the 75th percentile. The median (the 50th percentile) and outlying or extreme values are also charted.

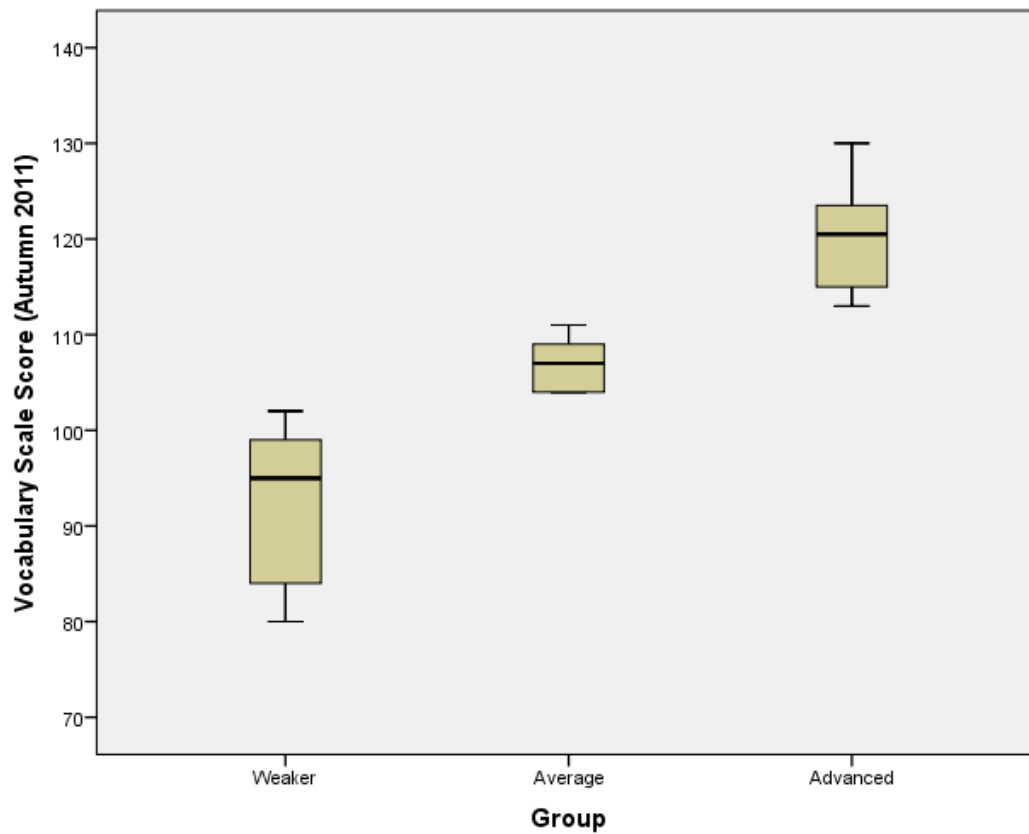
Variability: The length of the box represents the difference between the 25th and 75th percentiles. From the length of the box, you can determine the variability and the larger the box, the greater the spread of the data.

Central Tendency: The horizontal line inside the box represents the median. If the median is not in the center of the box, the distribution is skewed.

Whiskers: Are lines from the ends of the box to the largest and smallest values that are not outliers. These lines are called whiskers. If the upper whisker is much longer than the lower whisker, it gives the impression of positive skewness.

Outliers and Extremes: Symbols are used to label outliers (o) and extremes (*). The boxplots shown below indicate outliers and extremes.

Figure 1: DPRT Vocabulary Subscale by Group (Autumn 2011 and Spring 2012)



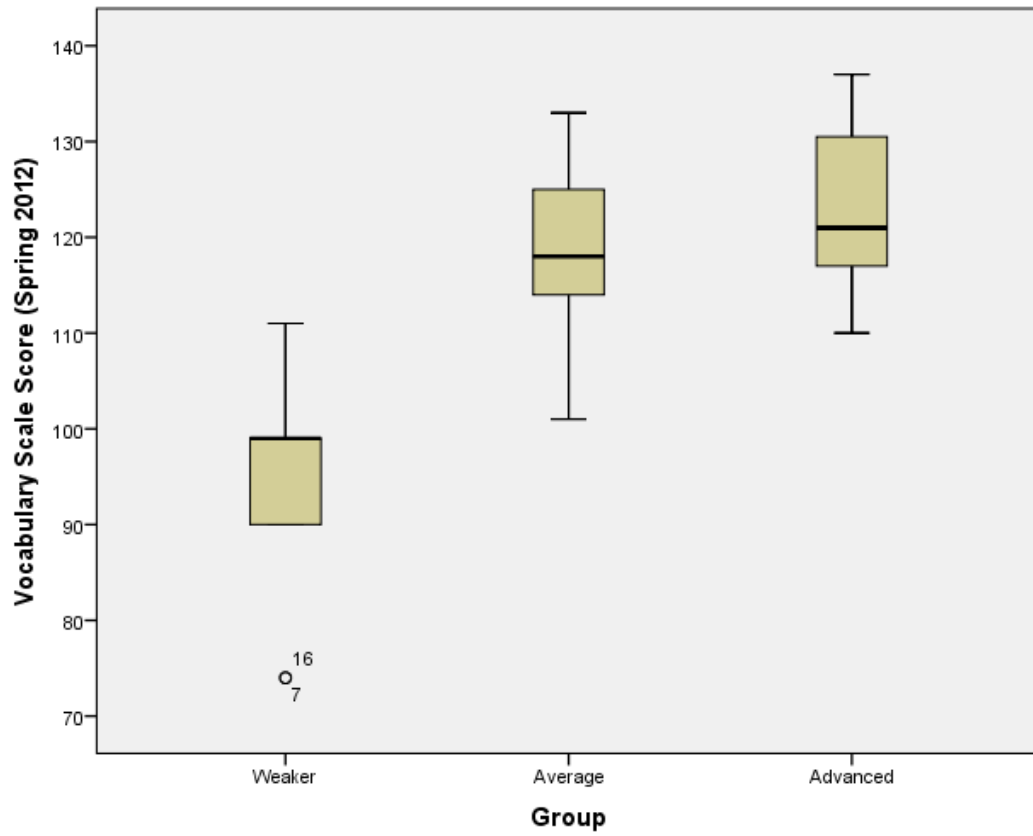
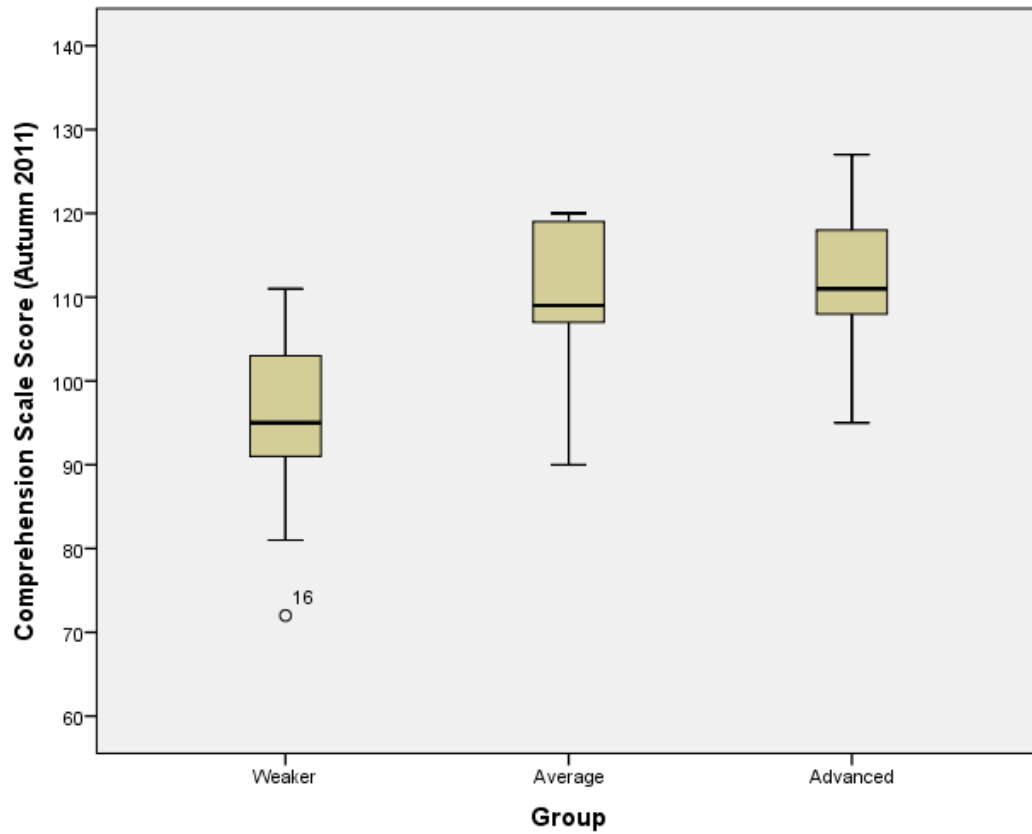


Figure 2: DPRT Comprehension Subscale by Group (Autumn 2011 and Spring 2012)



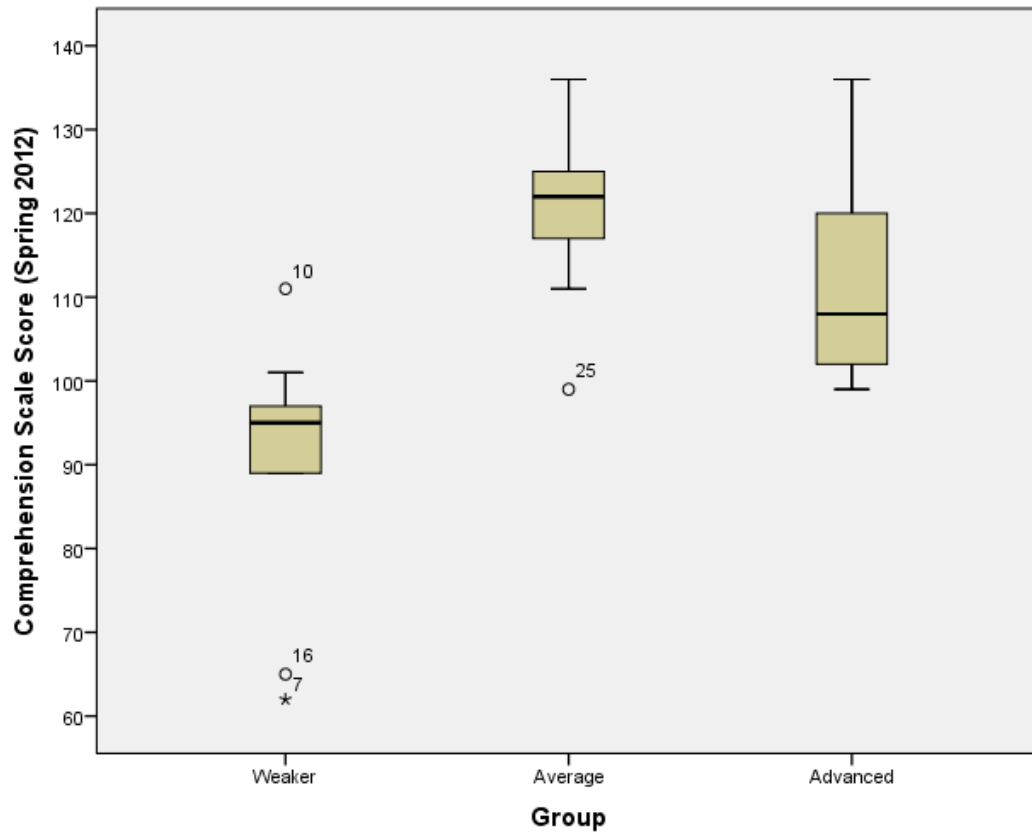
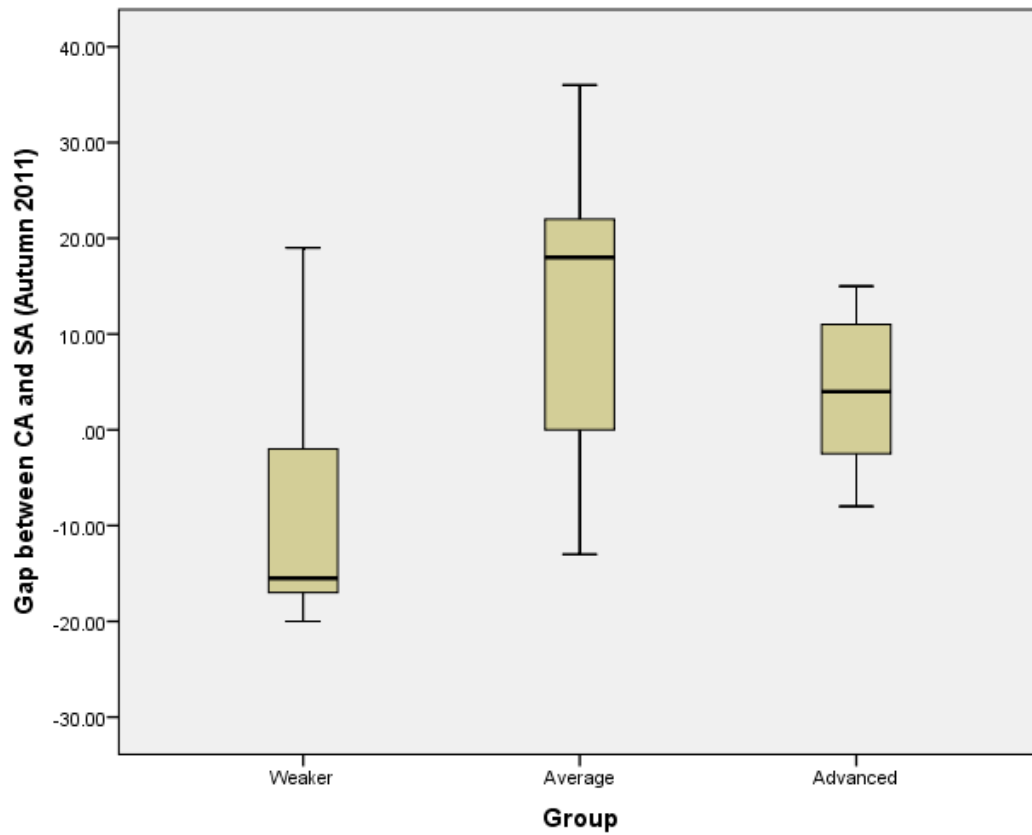
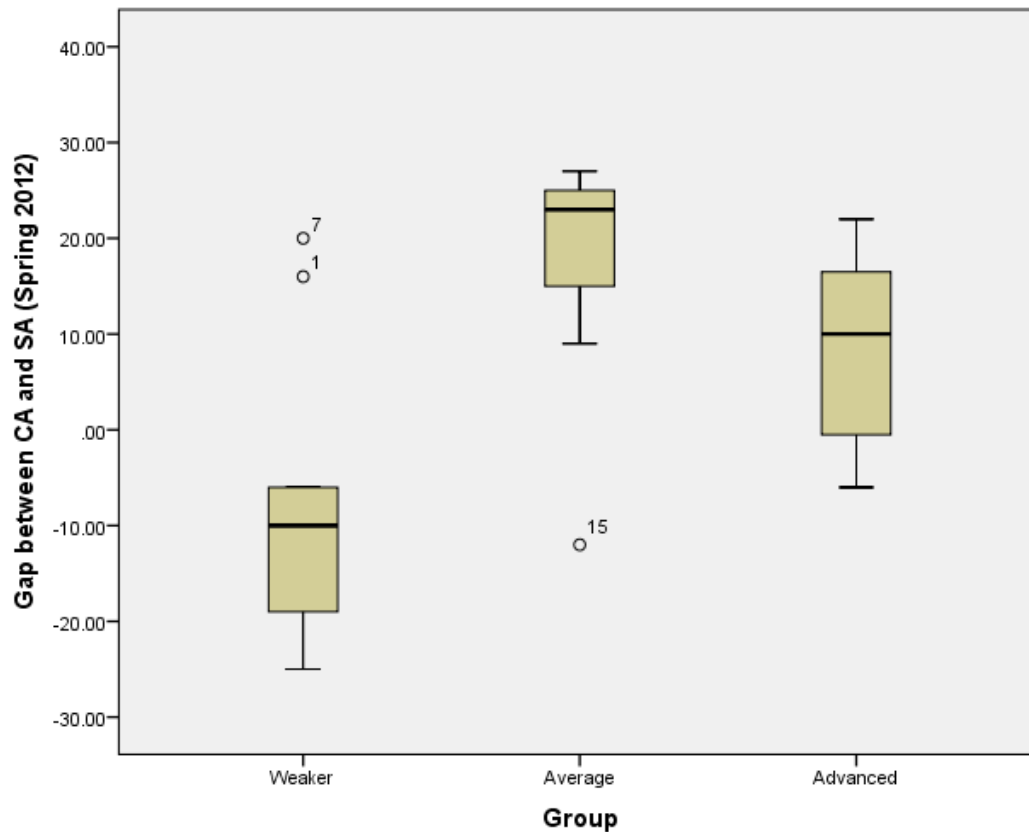


Figure 3: Aston Index Chronological Age/Spelling Age Gap (Autumn 2011 and Spring 2012)





Analysis by engagement in homework

Analysis of engagement in homework shows that those pupils in the “average” were much more likely to have done homework (Table 6).

Table 6: Engagement in Homework by Group

Homework	Weak		Average		Strong	
	n	%	n	%	n	%
No	4	44.4	2	22.2	1	8.3
Some	4	44.4	1	11.1	8	66.7
Yes	1	11.1	6	66.7	3	25.0
Total	9	100	9	100	12	100

Analysis of engagement in homework shows that those pupils (33%) who regularly did homework (shown in **bold** font) improved their scores by a significant margin compared to the others that did either some or no homework (Table 7).

Table 7: Before and After Outcome Measures by Engagement in Homework

Outcome	No Homework			Some Homework			Did Homework		
	n	Mean	SD	n	Mean	SD	n	Mean	SD
Vocabulary SS Autumn	7	97.7	14.6	13	111.0	12.3	10	111.4	8.8
Vocabulary SS Spring	7	93.1	14.4	12	114.3	11.4	10	123.4	9.1
Comprehension SS Autumn	7	95.9	15.7	13	110.5	10.5	10	108.4	8.9
Comprehension SS Spring	7	93.7	23.0	12	104.7	12.1	10	122.3	11.6
Spelling Gap CA and SA Autumn	7	3.7	20.3	11	0.4	13.5	10	6.3	13.3
Spelling Gap CA and SA Autumn	6	1.8	21.7	13	2.2	15.0	10	14.2	11.1

Analysis by gender

The class was made up of 13 girls and 17 boys. Tables 8, 9a and 9b show the gender mix of the three ability groups and engagement with homework.

Table 8: Group Membership by Gender

Group	Girls		Boys	
	n	%	n	%
Weak	3	23.1	6	35.3
Average	5	38.5	4	23.5
Strong	5	38.5	7	41.2
Total	13	100	17	100

Table 9a: Engagement in Homework by Gender

Homework	Girls		Boys	
	n	%	n	%
No	5	38.5	2	11.8
Some	5	38.5	8	47.1
Yes	3	23.1	7	41.2
Total	13	100	17	100

Table 9b: Before and After Outcome Measures by Gender

Outcome	N	Girls		N	Boys	
		Mean	SD		Mean	SD
Vocabulary SS Autumn	13	108.0	14.4	17	108.1	11.9
Vocabulary SS Spring	13	108.2	14.8	16	115.6	16.8
Comprehension SS Autumn	13	108.9	14.3	17	104.5	11.0
Comprehension SS Spring	13	111.0	20.0	16	105.8	17.5
Spelling Gap CA and SA Autumn	12	4.9	16.8	16	2.1	14.0
Spelling Gap CA and SA Autumn	12	7.0	17.4	17	5.7	15.5

CONCLUSION

Although this particular class of pupils were above average, in national terms, prior to the introduction of the programme – their scores had improved when tested again after the intervention. **Across the class 69% improved their reading attainment score and 92.5% improved their spelling age.**

Analysis of engagement in homework shows that those pupils (33%) who regularly did homework improved their scores by a significant margin compared to the others that did either some or no homework (Table 7).

The statistical outcomes from the Project support the hypothesis that:

“The online “WordsWorth Literacy Programme” © when used as a “collaborative” teaching tool, by a teacher in the classroom and also at home by a parent facilitating homework tasks - will significantly increase literacy skill attainments of the students involved”.

We would like to convey our gratitude and thanks to:

- Ms. Mary Nicholson (Principal) Kilkenny School Project, for sanctioning the Project.
 - Ms. Nicola Malone (Schoolteacher) for participating in the Project, testing the children before and after, running the Project in the classroom and for her general support overall.
 - Dr. David Millar (Research Associate – Educational Research Centre, Drumcondra, Dublin) for providing the time to compile the statistics for the Project.
 - The parents and schoolchildren who participated in the Project.
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